

Revisions of *Protoancylodiscoides* and *Bagrobdella*, with Redescriptions of *P. chrysichthes* and *B. auchenoglanii* (Monogenoidea: Dactylogyridae) from the Gills of Two Bagrid Catfishes (Siluriformes) in Togo, Africa

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ABSTRACT: The generic diagnoses of *Protoancylodiscoides* Paperna and *Bagrobdella* Paperna, are emended based on the study and redescription of the respective type species: *P. chrysichthes* Paperna from the gills of the bagrid catfishes *Chrysichthys nigrodigitatus* (Lacépède) and *B. auchenoglanii* Paperna from the gills of *Auchenoglanis occidentalis* (Cuvier and Valenciennes) collected from Togo, Africa. *Protoancylodiscoides* is characterized by species possessing hook shanks comprised of 2 subunits (proximal subunit variably expanded) in hook pairs 1, 6, and 7; a dorsal striated pouch (onchium) through which the extrinsic dorsal muscles extend; a sinistral vaginal pore; a V-shaped ventral bar and straight dorsal bar; tandem (or slightly overlapping) gonads (germarium pretesticular); and 2 seminal vesicles. *Bagrobdella* includes species with tandem gonads (germarium pretesticular); a sinistral vaginal aperture; hook pairs 1–4, 6, and 7 with shank comprised of 2 subunits (basal subunit variably expanded); and straight bars. The ventral bar in species of *Bagrobdella* possesses a long anteromedial projection associated with a lightly sclerotized skirt; the dorsal bar is adorned with a shield-like projection originating from the posterior margin of the bar.

KEY WORDS: Monogenoidea, Dactylogyridae, *Protoancylodiscoides*, *Bagrobdella*, *Protoancylodiscoides chrysichthes*, *Bagrobdella auchenoglanii*, *Chrysichthys nigrodigitatus*, *Auchenoglanis occidentalis*, catfish, Siluriformes, Bagridae, Pisces, Togo, Africa.

This paper is a continuation of our series on dactylogyrid genera from Africa. Earlier papers dealt with *Characidotrema* Paperna and Thurston, 1968, *Quadriacanthus* Paperna, 1961, and *Schilbetrema* Paperna and Thurston, 1968 (see Kritsky et al., 1987; Kritsky and Kulo, 1988; 1992a, respectively). In addition, 2 new genera of African Dactylogyridae have been proposed: *Quadriacanthoides* Kritsky and Kulo, 1988 (a junior subjective synonym of *Paraquadriacanthus* Ergens, 1988; see Kritsky, 1990), and *Schilbetrematoides* Kritsky and Kulo, 1992 (see Kritsky and Kulo, 1992b). In the present paper, *Protoancylodiscoides* Paperna, 1969, and *Bagrobdella* Paperna, 1969, are revised, and *Protoancylodiscoides chrysichthes* Paperna, 1969, and *Bagrobdella auchenoglanii* Paperna, 1969, the type species of their respective genera, are redescribed from the gills of siluriform fishes in Togo, Africa.

Materials and Methods

Fish hosts *Chrysichthys nigrodigitatus* (Lacépède, 1803) and *Auchenoglanis occidentalis* (Cuvier and Va-

lenciennes, 1840) were collected from localities in Togo during 1995–1996. Methods of collection, preservation, mounting, and illustration of helminths were those described by Kritsky et al. (1987). Measurements, all in micrometers, were made with a filar micrometer according to procedures of Mizelle and Klucka (1953), except that length of the male copulatory organ (MCO) of *P. chrysichthes* is an approximation of total length obtained by using a calibrated Minerva curvimeter on camera lucida drawings. Average measurements are followed by ranges and the number (*n*) of specimens measured in parentheses. Flattened specimens mounted in Gray and Wess' medium were used to obtain measurements of the hooks, anchors, and the copulatory complex. All other measurements were obtained from unflattened specimens stained with Gomori's trichrome or Mayer's carmine and mounted in synthetic resin. Voucher specimens of *P. chrysichthes* and *B. auchenoglanii* collected from Togo were deposited in the U.S. National Parasite Collection (USNPC), the helminth collections of the H. W. Manter Laboratory (HWM) of the University of Nebraska State Museum, and the Musée Royal de l'Afrique Centrale (MRAC) as indicated in the respective redescrptions. For comparative purposes, the following type specimens were examined: holotype and 3 paratypes (all on 1 slide) of *Protoancylodiscoides mansourensis* El-Naggar, 1987 (British Museum of Natural History [BMNH], London, 1985.1.8.1-2); 9 paratypes (all on 1 slide) of *Protoancylodiscoides malapteruri* Bilong, Birgi, and Le Brun, 1997 (BMNH 1996.4.7.6-7); 17

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paratypes (on 2 slides) of *P. malapteruri* (Muséum National d'Histoire Naturelle [MNHN 113 HF], Paris); holotype of *P. chrysichthes* Paperna, 1969 (MRAC 35.566); holotype of *B. auchenoglanii* Paperna, 1969 (MRAC 35.581); holotype of *Bagrobdella fraudulenta* Euzet and Le Brun, 1990 (MRAC 35.915).

Results

Class Monogenoidea Bychowsky, 1937

Order Dactylogyridea Bychowsky, 1937

Dactylogyridae Bychowsky, 1933

Protoancylodiscoides Paperna, 1969

EMENDED DIAGNOSIS: Body elongate, fusiform, comprised of cephalic region, trunk, peduncle, haptor. Tegument thin, smooth. Two terminal, 2 bilateral cephalic lobes; head organs present; cephalic glands unicellular, lateral or posterolateral to pharynx. Two pairs of eyes; granules subspherical. Mouth subterminal, mid-ventral; pharynx muscular, glandular; esophagus present; 2 intestinal ceca, confluent posterior to gonads, lacking diverticula. Genital pore mid-ventral near level of intestinal bifurcation. Gonads intercecal, tandem or slightly overlapping; germarium pretesticular. Vas deferens looping left cecum, ascending to level of genital pore where it empties into saccate seminal vesicle; short duct arises from seminal vesicle dilating into large granule-filled vesicle that empties into base of male copulatory organ (MCO). Copulatory complex comprising nonarticulated tubular MCO, accessory piece; accessory piece serving as guide for MCO; 2 dorsal glandular masses lying immediately posterior to genital atrium; prostatic reservoir present. Seminal receptacle pregermarial; vaginal aperture sinistral. Vitellaria coextensive with intestine, frequently extending into peduncle. Haptor with dorsal, ventral anchor/bar complexes, 7 pairs of hooks with ancyrocephaline distribution (Mizelle, 1936; see Mizelle and Price, 1963); hook pairs 1, 6, 7 with shanks comprised of 2 subunits, proximal subunit expanded; pairs 2–5 with shanks of 1 subunit. Dorsal striated tissue pouch (onchium) present. Ventral bar V-shaped; dorsal bar straight. Parasites of gills of African siluriform fishes.

TYPE SPECIES: *Protoancylodiscoides chrysichthes* Paperna, 1969, from *Chrysichthys nigrodigitatus* (Bagridae).

OTHER SPECIES: *Protoancylodiscoides malapteruri* Bilong, Birgi, and Le Brun, 1997, from *Malapterurus electricus* Gmelin, 1789 (Malapteruridae); *P. mansourensis* El-Naggar, 1987,

from *Chrysichthys auratus* Geoffroy, 1809 (Bagridae).

REMARKS: Paperna (1969) proposed *Protoancylodiscoides* for *P. chrysichthes* from the gills of *Chrysichthys nigrodigitatus* collected from 3 locations in Volta Lake, Ghana. He characterized the genus and differentiated it from *Ancylodiscoides* Yamaguti, 1937, by species having a “non-sclerotized bar” associated with the tip of the superficial root of each dorsal anchor, hooks of 2 different morphological types, and male reproductive organs shifted to the extreme posterior end of the body. Paperna (1969) clearly erred when describing the “non-sclerotized bars,” as these structures represent the well-developed dorsal extrinsic muscles that insert on the tip of the superficial root of each dorsal anchor and extend to the midline of the haptor where their direction abruptly curves toward their origins in the peduncle or trunk (El-Naggar, 1987; Bilong et al., 1997). At the midline of the haptor, these muscles extend through a superficial dorsal pouch-like structure (onchium) before proceeding anteriorly toward their origins (Fig. 4). Contraction of the muscles apparently results in lateral displacement of the anchor points, thereby embedding its tip in host tissue during attachment.

Apparently Paperna (1969) considered “hooks of two types” to refer to the hook shank being composed of either 1 or 2 subunits, with the proximal subunit (when present) dilated to varying degrees. However, the presence of multiple hook types within species of Dactylogyridae is common and should probably not be used to differentiate genera without determination of the type present in homologous hook pairs. Hook types similar to those shown in Figures 5, 6, 9, and 10 for hook pairs 1, 6, and 7 in *Protoancylodiscoides chrysichthes* are also found in some African and Asian species infesting siluriform fishes: *Quadriacanthus* Paperna, 1961 (pairs 1, 6, and 7; see Kritsky and Kulo, 1988); *Bychowskyella* Achmerow, 1952 (pairs 1, 6, and 7; see Lim, 1991); and *Bagrobdella* Paperna, 1969 (pairs 1–4, 6, and 7). Also, in species of *Chauhanellus* Bychowsky and Nagibina, 1969 (all marine), and some (but not all) freshwater species of *Demidospermus* Suriano, 1983 (neotropical), all of which infest siluriform fishes, similar hooks have been reported (pairs 1–4, 6, and 7 in *Chauhanellus*; and pairs 1, 2, and 7 in *Demidospermus* (see Lim, 1994; Kritsky and

Gutiérrez, 1998, respectively). Based on hook types, therefore, species of *Protoancylodiscoides* show affinity to those of *Quadriacanthus* and *Bychowskyella* and perhaps those of *Bagrobdella* and *Chauhanellus*.

Although *Protoancylodiscoides chrysichthes* and *P. mansourensis* have elongate MCOs that extend from the level of the ovary to that of the esophageal bifurcation, the positions of this and other male reproductive organs are not outstanding. The only "shifting" of organs posteriorly in these 2 species are those of the distal seminal vesicle and prostatic reservoir to near the body midlength; both shifts are apparently accommodations to the posterior position of the base of the elongate MCO. In *P. malapteruri*, with a comparatively shorter MCO, these organs lie in the usual position of the anterior trunk (Bilong et al., 1997). Although Paperna (1969) showed the testis far posterior to the germarium in his whole-mount drawing of *P. chrysichthes*, the specimen on which the drawing was based was clearly distorted and flattened, which may have produced the pattern illustrated. In the present specimens, including the types of *P. mansourensis* and *P. malapteruri*, the gonads are tandem or slightly overlapping.

Based on its emended diagnosis, *Protoancylodiscoides* is now characterized by the combined presence of 1) hook shanks comprised of 2 subunits (proximal subunit expanded to varying amounts) in hook pairs 1, 6, and 7; 2) a striated pouch (onchium) on the dorsal surface of the haptor and through which the dorsal extrinsic muscles extend; 3) a sinistral vaginal pore; 4) a V-shaped ventral bar and a straight dorsal bar; 5) tandem (or slightly overlapping) gonads; and 6) a proximal saccate seminal vesicle followed by a fusiform distal vesicle.

***Protoancylodiscoides chrysichthes* Paperna, 1969**

(Figs. 1–14)

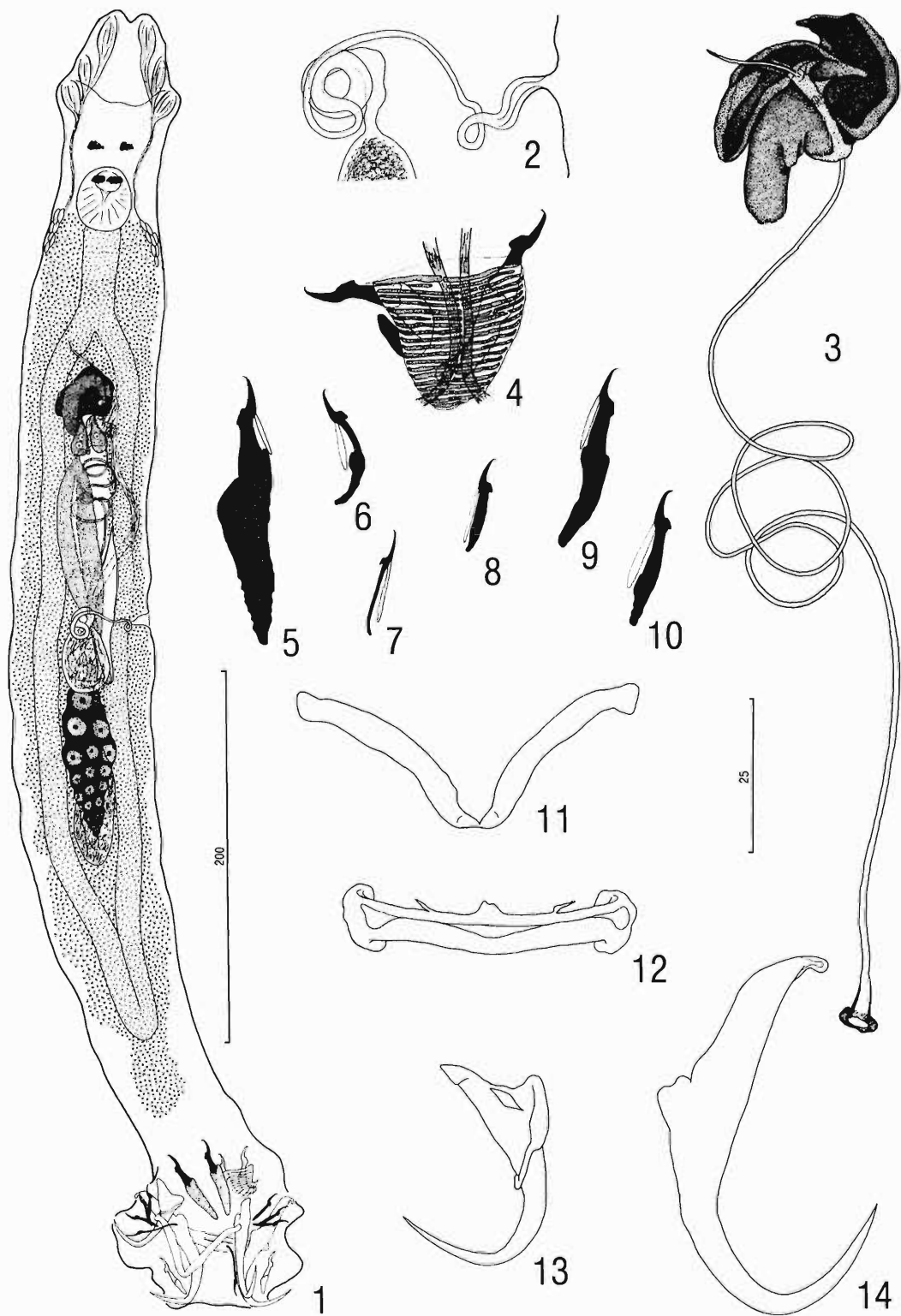
HOST AND LOCALITY: Gills of *Chrysichthys nigrodigitatus*, Bagridae; Anié River, Kpéhoun, Togo.

PREVIOUS RECORDS: *Chrysichthys nigrodigitatus* from 3 localities on Volta Lake, Ghana (Paperna, 1969, 1979); *C. auratus* from Lake Tiga, Kano, northern Nigeria (Ndifon and Jima, 1990).

SPECIMENS STUDIED: Forty-nine voucher specimens, USNPC 88263, 88264, 88265, 88266, 88267, HWML 39924, MRAC 37.422 (all from Togo).

REDESCRIPTION: Body 637 (410–884; $n = 29$) long; greatest width 90 (73–115; $n = 33$) near midlength. Cephalic region ventrally concave, lobes moderately developed, 3 bilateral pairs of head organs. Members of posterior pair of eyes slightly larger, closer together than those of anterior pair; subspherical granules moderately large; accessory granules absent or few in cephalic region. Pharynx ovate, greatest diameter 30 (23–43; $n = 35$); esophagus elongate. Peduncle elongate; haptor subhexagonal, 99 (79–140; $n = 29$) long, 94 (74–127; $n = 23$) wide. Ventral anchor 33 (29–38; $n = 5$) long; with differentiated roots connected by delicate or perforated web; thickened ridge originating from posterior margin of deep root, extending across base of shaft; shaft curved, point elongate; base 20 (17–22; $n = 3$) wide. Dorsal anchor 64 (55–69; $n = 10$) long, with elongate superficial root with curled tip, short truncate deep root, curved shaft, elongate point; base 31 (27–36; $n = 6$) wide. Ventral bar 68 (55–80; $n = 12$) long, 45 (35–69; $n = 15$) between ends, V-shaped, with slightly enlarged terminations; dorsal bar 41 (34–46; $n = 20$) long, straight, with short blunt anteromedial projection, pair of bilateral sliver-like projections frequently present on anterior margin, ends enlarged. Hook pairs 1, 6, 7 with shank of 2 subunits, proximal subunit lightly sclerotized, variably expanded, point delicate; hook pairs 2, 3, 4 with shank comprised of 1 subunit, slightly expanded; hook pair 5 delicate, with depressed thumb. Hook pair 1: 42 (38–45; $n = 3$); hook pairs 2, 3, 4: 16 (14–17; $n = 12$); hook pair 5: 18 (17–19; $n = 4$); hook pair 6: 23 (20–26; $n = 6$); hook pair 7: 30 (22–35; $n = 4$) long;

Figures 1–14. *Protoancylodiscoides chrysichthes* Paperna, 1969. All figures are drawn to the 25 μ m scale, except Figure 1 (200 μ m scale). 1. Whole mount (ventral, composite). 2. Vagina and distal seminal receptacle. 3. Copulatory complex (ventral). 4. Dorsal pouch, dorsal extrinsic muscle and hook pair 7. 5. Hook pair 1. 6. Hook pair 1 (variant). 7. Hook pair 5. 8. Hook pair 4. 9. Hook pair 7. 10. Hook pair 6. 11. Ventral bar. 12. Dorsal bar. 13. Ventral anchor. 14. Dorsal anchor.



hook pair 1 (variant): 22 ($n = 1$) long. Filamentous hooklet (FH) loop extending to proximal end of distal subunit of shank. MCO an elongate tube winding from base at level of germarium to genital atrium near level of intestinal bifurcation, base of MCO with sclerotized margin; MCO 255 (162–365; $n = 5$) long. Accessory piece variable, comprising 2 or 3 articulated subunits, elongate nipple (preputium) guiding distal portion of MCO shaft. Testis 50 (32–71; $n = 8$) long, 24 (21–32; $n = 8$) wide, elongate ovate; saccate proximal seminal vesicle subconical, lying sinistral to genital atrium, separated from distal vesicle by short duct with sphincter-like muscle; distal vesicle fusiform; prostatic reservoir fusiform, lying ventral to left cecum at mid-length of body. Germarium fusiform, with irregular margins, 85 (61–113; $n = 15$) long, 31 (21–40; $n = 15$) wide; oviduct, ootype not observed; vaginal aperture at body midlength; vagina comprising distal thick-walled funnel, proximal coiled tube poorly sclerotized with 2–3 rings (ring direction counterclockwise proximally, reversing to a clockwise direction distally), emptying into subovate seminal receptacle overlying anterior extremity of germarium; diameter of vaginal ring 16 (13–20; $n = 26$); vitellaria dense throughout trunk, extending into peduncle, absent in regions of other reproductive organs.

REMARKS: *Protoancylodiscoides chrysichthes* is very similar to *P. mansourensis*, and differentiation of the 2 species is based on relatively few morphometric characters. Comparison with the holotype and 3 paratypes of the latter species has revealed the following differences: 1) in *P. chrysichthes*, the coiled vagina has 2–3 rings (4–5 rings in *P. mansourensis*); 2) the diameter of the rings of the vagina is greater in *P. mansourensis* (24 to 27 μm) than in *P. chrysichthes* (13 to 20 μm).

In addition, El-Naggar (1987) differentiated the 2 species utilizing morphometric features, the presence/absence of a “preputium” associated with the tip of the MCO, and a haptoral funnel-like structure through which the dorsal extrinsic muscles extend. However, our measurements of the type specimens of *P. mansourensis* showed that body length (497–650 μm) does not differ from that of our specimens of *P. chrysichthes* (410–884 μm). Indeed, our measurements of body length of the flattened holotype and paratypes of *P. mansourensis* did not fall within the range (710–1,000 μm) reported

by El-Naggar (1987), indicating that some of his conversions were in error. Although measurements of body length presented by Paperna (1969) for *P. chrysichthes* had only 1 significant digit, resulting in difficulty in determining the rounding effects, his range (400–500 μm) falls within those reported herein for the types of *P. mansourensis* and for our specimens from Togo.

With the exception of the total length of the dorsal anchor, differences in all other measurements of *P. chrysichthes* and *P. mansourensis* reported herein may be explained by potential rounding effects. In specimens of *P. chrysichthes* from Togo, the length of the dorsal anchor ranged from 55 to 69 μm , whereas our values for the type specimens of *P. mansourensis* were 78 to 83 μm . Paperna (1969) reported 100 to 110 μm for this parameter, but this range does not necessarily exclude our measurements because of possible rounding effects. Therefore, dorsal anchor length is problematic in differentiating *P. mansourensis* from *P. chrysichthes*.

Although Paperna (1969) described a “preputium” associated with the distal end of the MCO, we were unable to find this structure in our specimens. However, it is likely that Paperna’s “preputium” refers to a small, elongate, often longitudinally striated portion of the accessory piece through which the tip of the MCO projects. A similar component of the accessory piece is also visible in the holotype and paratypes of *P. mansourensis*. Finally, presence of a dorsal “funnel-like structure” (of El-Naggar, 1987) or “onchium” (of Bilong et al., 1997) through which the dorsal extrinsic muscles of the haptor extend is probably a generic character, because it also occurs in our specimens of *P. chrysichthes*.

It is clear that *P. chrysichthes* and *P. mansourensis* are poorly differentiated, and they may be synonyms. However, we do not feel that available information on the 2 forms (species) justifies proposal of synonymy at this time. Additional collections from throughout the range of the host would be necessary to determine intra-specific variation within the species. If the 2 species are distinct, the record of *P. chrysichthes* from *C. auratus* in Nigeria (Ndifon and Jimeta, 1990) must be confirmed.

Protoancylodiscoides malapteruri is easily differentiated from the 2 species discussed above by the presence of a elongate proximal rod in the accessory piece (absent in *P. chrys-*

ichthes and *P. mansourensis*). In *P. malapteruri*, the MCO is shorter and less convoluted than that of *P. chrysichthes* or *P. mansourensis*.

***Bagrobdella* Paperna, 1969**

EMENDED DIAGNOSIS: Body robust, fusiform, comprised of broad cephalic region, trunk, peduncle, haptor. Tegument thin, smooth. Two terminal, 2 bilateral cephalic lobes; head organs present; cephalic glands unicellular, posterolateral to pharynx. Two pairs of eyes; granules subspherical. Mouth subterminal, midventral; pharynx muscular, glandular; esophagus short; 2 intestinal ceca, confluent posterior to gonads, lacking diverticula. Genital pore dextroventral about $\frac{1}{2}$ distance between germarium and intestinal bifurcation. Gonads intercecal, tandem; germarium pretesticular. Vas deferens looping left cecum; seminal vesicle a simple dilation of vas deferens. Copulatory complex a coiled tube with clockwise rings (see Kritsky et al., 1985), directed posteriorly from MCO base, lacking accessory piece; prostatic vesicle present. Seminal receptacle pregermarial; vaginal aperture sinistral. Vitellaria coextensive with intestine. Haptor with dorsal, ventral anchor/bar complexes, 7 pairs of hooks with ancyrocephaline distribution (Mizelle, 1936; see Mizelle and Price, 1963); pairs 1–4, 6, 7 with shanks comprised of 2 subunits, proximal subunit expanded; pair 5 with shank of 1 subunit. Ventral bar straight, with long anterior projection associated with lightly sclerotized skirt; dorsal bar straight, with posterior shield-like projection. Parasites of gills of siluriform fishes.

TYPE SPECIES: *Bagrobdella auchenoglanii* Paperna, 1969, from *Auchenoglanis occidentalis* (Bagridae).

OTHER SPECIES: *Bagrobdella fraudulenta* Euzet and Le Brun, 1990 (syn. *B. auchenoglanii* of Paperna, 1971), *B. anthopenis* Euzet and Le Brun, 1990, both from *Auchenoglanis occidentalis*.

REMARKS: Euzet and Le Brun (1990) emended the diagnosis of *Bagrobdella* and corrected some initial observations on internal anatomy and haptoral sclerites offered by Paperna (1969). Our emendation adds to their diagnosis the morphologic differences between respective hook pairs and details of the coil of the MCO.

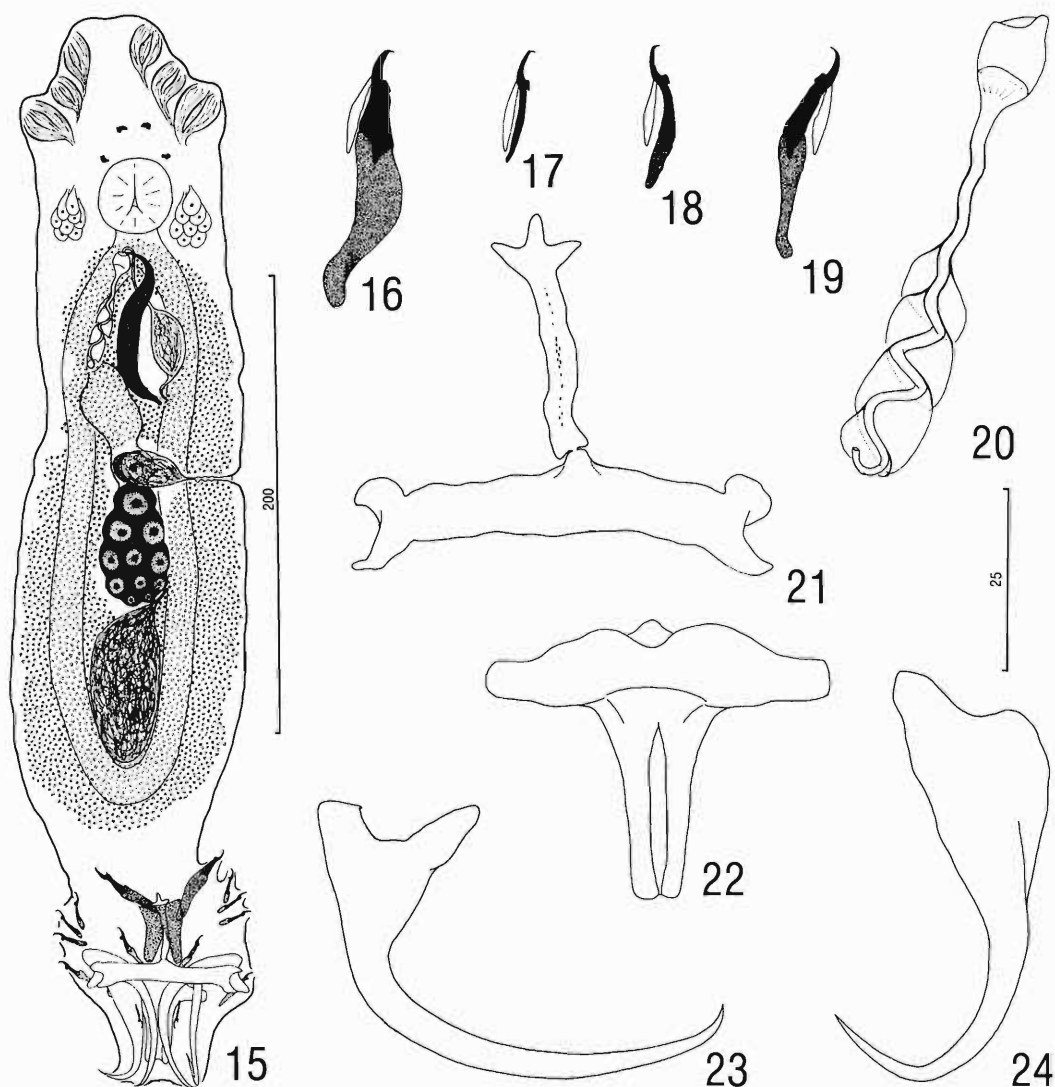
***Bagrobdella auchenoglanii* Paperna, 1969 (Figs. 15–24)**

HOST AND LOCALITY: Gills of *Auchenoglanis occidentalis*, Bagridae; Barrage du “Chantier Rouge,” Kara River, Kara, Togo.

PREVIOUS RECORDS: *Auchenoglanis occidentalis*, Volta Lake, Ghana (Paperna, 1969, 1979); Niger River at Bamako, Mali (Euzet and Le Brun, 1990).

SPECIMENS STUDIED: Forty-four vouchers, USNPC 88258, 88259, 88260, 88261, 88262, HWML 39925, MRAC 37.423 (all from Togo).

REDESCRIPTION: Body 457 (361–686; $n = 25$) long; greatest width 103 (78–130; $n = 25$) in posterior trunk. Cephalic region broad; cephalic lobes well developed. Eyes subequal; members of posterior pair farther apart than members of anterior pair; granules small; accessory granules absent, infrequently few in cephalic region. Pharynx subspherical to ovate, 28 (24–33; $n = 24$) in greatest diameter. Peduncle broad; haptor subhexagonal, 91 (78–113; $n = 25$) long, 93 (79–104; $n = 27$) wide. Ventral anchor 42 (37–45; $n = 11$) long, with short roots, evenly curved elongate shaft abruptly flexed immediately distal to anchor base; tip of point recurved; base 22 (19–24; $n = 10$) wide. Dorsal anchor 56 (50–58; $n = 11$) long, with poorly differentiated roots, curved shaft, long point; base 22 (18–25; $n = 7$) wide. Ventral bar 46 (42–53; $n = 17$) long, with bifurcated ends surrounding superficial surface of anchor base; anteromedial projection 27 (24–31; $n = 19$) long, distally trifid; skirt delicate. Dorsal bar 59 (53–65; $n = 24$) long, yoke shaped, with subtrapezoidal posterior shield; shield 35 (31–40; $n = 25$) long. Hook pair 1: 35 (30–37; $n = 11$), pairs 2, 3, 4: 21 (20–23; $n = 14$), pairs 6, 7: 29 (26–36; $n = 10$) long, each with truncate thumb, delicate shaft, point, proximal subunit of shaft variable in length between hook pairs; hook pair 5: 16–17 ($n = 3$) long, with delicate point, shaft, shank with 1 subunit; FH loop about length of distal subunit of shank. MCO 63 (52–74; $n = 11$) long, a coil of about 6 rings, proximal 3 rings poorly defined, distal 3 rings with delicate cup-like processes; base expanded, lightly sclerotized. Testis 40 (28–53; $n = 10$) long, 28 (20–35; $n = 7$) wide, ovate; seminal vesicle ovate; prostatic reservoir elongate fusiform. Germarium pyriform, 44 (35–56; $n = 22$) long, 29 (20–42; $n = 22$) wide; oviduct broad; ootype not



Figures 15–24. *Bagrobdella auchenoglanii* Paperna, 1969. All figures are drawn to the 25 μ m scale, except Figure 15 (200 μ m scale). 15. Whole mount (ventral, composite). 16. Hook pair 1. 17. Hook pair 5. 18. Hook pairs 2, 3, 4, 7. 19. Hook pair 6. 20. Copulatory complex (ventral). 21. Ventral bar. 22. Dorsal bar. 23. Ventral anchor. 24. Dorsal anchor.

observed; uterus delicate; vagina a simple non-sclerotized straight tube; seminal receptacle submedian, pregerminal. Vitellaria dense throughout trunk, except absent in regions of other reproductive organs.

REMARKS: Measurements of specimens of *Bagrobdella auchenoglanii* from Togo compare favorably with those reported by Euzet and Le Brun (1990) for their material from Mali. Paperna's (1969) measurements are generally great-

er than those reported herein. Reported differences between respective studies are not considered sufficient to separate the collections into separate species and likely represent intraspecific variability between geographic localities.

Because Paperna's (1971) redescription of *Bagrobdella auchenoglanii* from *Auchenoglanis occidentalis* in Lake Albert, Uganda, was based on specimens of *B. fraudulenta* (see Euzet and Le Brun, 1990), the Ugandan records reported

by Paperna (1971, 1979) are for the latter species. *Bagrobdella auchenoglanii* is not known from Uganda.

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